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THE UNCERTAIN SEARCH FOR A DESIGN DEFECT STANDARD

STEVEN G. DAVISON*

INTRODUCTION

In design defect litigation, the injured plaintiff seeks to establish that the design and specifications for a product are inadequate because the manufacturer failed to use some alternative safer design.¹ Although

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1. Three principal categories of product defects can be identified: (1) manufacturing defects, (2) design defects, and (3) inadequate warnings or instructions concerning the hazards presented by the product. *See* W. PROSSER, *HANDBOOK OF THE LAW OF TORTS* § 99 (4th ed. 1971). While only design defects will be discussed in this article, these defects perhaps can best be described in relation to each other. A manufacturing defect, for example, involves a situation in which the product that caused an injury was not produced in accordance with the manufacturer's design and specifications. *See* Wade, *On the Nature of Strict Tort Liability*, 44 *MISS. L.J.* 825, 831 (1973). Such defects may be the result of flawed components or raw materials used in manufacturing the product. *See, e.g.*, *Ethicon, Inc. v. Parten*, 520 S.W.2d 527 (Tex. Civ. App. 1975) (metal in surgical needles weakened by "crimping" and drilling process, though manufacturer took steps to prevent the flaw).

In a design defect case, the product is manufactured in accordance with the manufacturer's design and specifications, but the design specifications are inadequate because the manufacturer did not use a safer alternative design. *See, e.g.*, *Micallef v. Miehle Co.*, 39 N.Y.2d 376, 386, 348 N.E.2d 571, 578, 384 N.Y.S.2d 115, 121 (1976) (printing press manufacturer failed to use guards that would have protected operator from hand injury). In both design and manufacturing defect cases, the injured plaintiff attempts to recover damages by establishing that the product was not made in accordance with a benchmark design or specification. In a manufacturing defect case, the manufacturer's failure to produce the product in accordance with his own design and specifications is unintentional and accidental. In a design defect case, on the other hand, the product design is the result of an intentional decisionmaking process that is "defective," "wrongful," or "inadequate." *See* Henderson, *Judicial Review of Manufacturers' Conscious Design Choices: The Limits of Adjudication*, 73 *COLUM. L. REV.* 1531 (1973).

The third category of product defects, lack of adequate warnings or instructions, involves a failure to provide, with a product, both warnings of the dangers that consumers may encounter if they do not use the product for its proper purpose and instructions that inform the user how to avoid these dangers. *See* *McClanahan v. California Spray Corp.*, 194 Va. 842, 75 S.E.2d 712 (1953) (orchard spray manufacturer liable for failure to warn of danger to orchards if spray improperly used).

A sub-category of principal defects is "crashworthiness" or "second collision" defects. These defects do not cause the initial accident, but rather enhance the person's injuries when he collides with the interior or exterior of the product. *See, e.g.*, *Volkswagen of America, Inc. v. Young*, 272 Md. 201, 207, 321 A.2d 737, 740 (1979). "Crashworthiness" defects can be design defects, as in *Turner v. General Motors Corp.*, 584 S.W.2d 844 (Tex. 1979), or manufacturing defects, as in *Lahocki v. Contee Sand & Gravel Co.*, 41 Md. App. 579, 398 A.2d 490 (1979), *rev'd on other grounds sub nom.* *General Motors Corp. v. Lahocki*, 286 Md. 714, 410 A.2d 1039 (1980).

courts² and commentators³ have devoted much attention to developing an appropriate standard to apply in evaluating a product's design, the courts have not adopted a universal test for analyzing a product's inadequacy or defectiveness.⁴ The lack of a clear standard may not provide manufacturers with sufficient guidance in developing a product's design and, consequently, may deny consumers a safer and less costly product.

The present design defect standards do not require the judge or the jury, before holding a manufacturer liable, to find that an alternative, technologically feasible design is possible that would have prevented plaintiff's injuries. The standards, moreover, do not require the trier of fact to find that adoption of an alternative design would have been a better allocation of the manufacturer's and society's resources. As a result, there are no objective criteria for judges to apply in deciding whether to submit a design defect case to the jury. Furthermore, if the case is submitted to the jury, the jury may impose liability on a manufacturer on the basis of whim or caprice.

This article will examine critically the six major tests for deciding whether a product's design is inadequate or defective by discussing each test and its inherent weaknesses in actual application. The article then proposes a new test that should remedy the shortcomings of the other design defect tests. The proposed standard does not impose liability on a manufacturer unless the plaintiff establishes that there is a safer, technologically feasible alternative design that results in a more efficient allocation of resources under a marginal cost-benefit analysis, or that the product's design is so dangerous that it should not be marketed even though no safer design exists. The article concludes that such a standard would give manufacturers fair notice about the requirements for the product's design and promote an optimum allocation of resources.

2. For a compilation of products liability cases concerning design defects, see Annot., 96 A.L.R.3d 22 (1979).

3. See generally A. WEINSTEIN, A. TWERSKI, H. PIEHLER & W. DONAHER, *PRODUCTS LIABILITY AND THE REASONABLY SAFE PRODUCT* (1978); Fischer, *Products Liability—The Meaning of Defect*, 39 MO. L. REV. 339 (1974); Henderson, *Design Defect Litigation Revisited*, 61 CORNELL L. REV. 541 (1976) [hereinafter cited as *Defect Litigation*]; Henderson, *Renewed Judicial Controversy Over Defective Product Design: Toward the Preservation of an Emerging Consensus*, 63 MINN. L. REV. 773 (1979) [hereinafter cited as *Renewed Controversy*]; Henderson, note 1 *supra*; Hoenig, *Product Designs and Strict Tort Liability: Is There a Better Approach?*, 8 SW. U.L. REV. 109 (1976); Keeton, *Manufacturer's Liability: The Meaning of "Defect" in the Manufacture and Design of Products*, 20 SYRACUSE L. REV. 559 (1969); Keeton, *Product Liability and the Meaning of Defect*, 5 ST. MARY'S L.J. 30 (1973); Keeton, *Products Liability—Design Hazards and the Meaning of Defect*, 10 CUM. L. REV. 293 (1979); Phillips, *The Standard for Determining Defectiveness in Products Liability*, 46 U. CIN. L. REV. 101 (1977); Twerski, Weinstein, Donaher & Piehler, *The Use and Abuse of Warnings in Products Liability—Design Defect Litigation Comes of Age*, 61 CORNELL L. REV. 495 (1976); Wade, *supra* note 1; Walkowiak, *Product Liability Litigation and the Concept of Defective Goods: "Reasonableness" Revisited?*, 44 J. AIR LAW & COM. 705 (1979).

4. But see *Renewed Controversy*, *supra* note 3, at 773-76 (emerging consensus that the cost-benefit analysis is the proper analysis).

I. THE PURPOSES THAT A DESIGN DEFECT TEST SHOULD SERVE

A design defect standard has three basic purposes. It is used to alleviate a plaintiff's difficulty in proving fault or lack of reasonable care by a manufacturer in designing a product,⁵ to allocate risks and spread losses from injuries resulting from the use of defective products,⁶ and to provide an incentive to manufacturers to produce a safe product.⁷ In order to fulfill this third objective, a design defect standard must provide a manufacturer with precise guidelines concerning minimum product safety. Guidelines will enable the manufacturer to predict whether he will be held liable for damages if the product's design causes injury to persons or property.

If a design defect standard does not enable the manufacturer to make a reasonable determination regarding the minimum safety requirement expected for the product, and the manufacturer's design falls below such minimum requirements and results in injury to persons or property, the public is harmed in at least two ways. First, consumers may incur injuries that might have been avoided if a safer design had been adopted or, if no safer design were available or feasible, the product had not been marketed. Second, if the manufacturer cannot determine minimum product safety requirements, an inefficient allocation of resources may result, with the consumer bearing the burden.⁸

Similarly, if the lack of precision in a design defect standard causes a manufacturer to err on the side of caution and produce a product that is much safer than the law requires, society may again suffer. Additional safety measures, not required by law, can raise the product's price by an exorbitant amount or significantly decrease the product's utility.⁹ Moreover, the capital needed to design and produce these additional safety features may have to be diverted from uses that society might find more desirable. In recognition of these concerns, courts do not require a

5. See *Escola v. Coca-Cola Bottling Co.*, 24 Cal. 2d 453, 461, 150 P.2d 436, 440 (1944) (Traynor, J., concurring) (absolute liability advocated as logical extension of concept of implied warranty of safety).

6. One court has stated this purpose to be "the primary policy rationale convincing courts to adopt strict products liability." *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871, 877 (Alaska 1979).

7. *Id.*

8. Such misallocation occurs when the costs of the liability for damages to injured consumers—damages that would have been avoided if a safer design had been used—exceed both the manufacturer's transaction costs of making a safer design and the abatement costs of producing a safer product. See, e.g., Posner, *Strict Liability: A Comment*, 2 J. LEG. STUD. 205 (1973) (suggests retaining contributory negligence defense as incentive for party with most efficient solution to take precautions in order to reduce avoidable costs to society); Sachs, *Negligence or Strict Product Liability: Is There Really a Difference in Law or Economics?*, 8 GA. J. INT'L & COMP. L. 259 (1978) (focusing on the economic costs and benefits of strict products liability).

9. See, e.g., *Micallef v. Miehle Co.*, 39 N.Y.2d 376, 387, 348 N.E.2d 571, 578, 384 N.Y.S.2d 115, 122 (1976) (product can become unworkable when an alleged missing feature is added or can become so expensive as to be priced out of the market).

manufacturer to design an "accident-proof" or "injury-proof" product or to act as an insurer.¹⁰

A design defect standard should be as precise as possible because society is ill-served if a manufacturer designs a product that is considerably more safe or less safe than the law requires. At the same time, the standard should continue to serve the goals of protecting consumers from injury and compensating those who are injured while using a product.

II. THE MAJOR DESIGN DEFECT TESTS

The courts generally apply one or more of the following six tests to determine whether a product is defective in its design:¹¹ (1) the deviation-from-the-norm test;¹² (2) the Restatement (Second) of Torts section 402A test;¹³ (3) the ordinary consumer expectations test;¹⁴ (4) the risk-utility test;¹⁵ (5) the California hybrid test;¹⁶ and (6) Professor Henderson's design test.¹⁷ A critical examination of the six major design defect standards illustrates several weaknesses in each. These inadequacies lead to numerous problems for courts, juries, and manufacturers in applying these standards, thereby indicating a need for a new, more effective

10. See, e.g., *Volkswagen of America, Inc. v. Young*, 272 Md. 201, 216-17, 321 A.2d 737, 745 (1974). Automobile manufacturers, however, are under a duty to use such care as would "avoid subjecting the user to an unreasonable risk of injury in the event of a collision." *Id.* at 217, 321 A.2d at 746 (quoting *Larsen v. General Motors Corp.*, 391 F.2d 495 (8th Cir. 1968)).

11. The first five tests are recognized as the major tests used by the courts to determine product defectiveness. See *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871, 880 (Alaska 1979). Professor James Henderson proposed a sixth test in Henderson, *supra* note 1.

12. Under this test, a product is defective if it does not compare in quality to most similar products. Thus, the manufacturer is liable for injuries resulting from the product's "deviation from the norm." See Traynor, *The Ways and Means of Defective Products and Strict Liability*, 32 TENN. L. REV. 363, 367 (1965). See also notes 18-27 & accompanying text *infra*.

13. The seller is liable for injury caused by a product if it is in a defective condition unreasonably dangerous to the user, to the consumer, or to his property. RESTATEMENT (SECOND) OF TORTS § 402A (1965) [hereinafter cited as RESTATEMENT]. See notes 28-32 & accompanying text *infra*.

14. A product is defective if: (1) it leaves the seller's hands in an unreasonably dangerous condition not contemplated by the consumer, and (2) it is more dangerous than the ordinary consumer with ordinary knowledge of the product's characteristics would expect. *Grenno v. Clark Equip. Co.*, 237 F. Supp. 427 (N.D. Ind. 1965). This test is also generally known as the user-oriented or seller-oriented test. See notes 33-56 & accompanying text *infra*.

15. Under this test, the court weighs diverse factors relating to the product's utility or desirability and its risk or dangerousness. See Keeton, *Product Liability and the Meaning of Defect*, *supra* note 3, at 37-38; Wade, *supra* note 1, at 837-38. See also notes 49-87 & accompanying text *infra*.

16. The California Supreme Court in *Barker v. Lull Eng'g Co.*, 20 Cal. 3d 413, 573 P.2d 443, 143 Cal. Rptr. 225 (1978), adopted a design defect test that combines the consumer expectation test with a risk-utility analysis. See notes 88-107 & accompanying text *infra*.

17. Henderson proposes that courts should not find a manufacturer's inadvertent design error defective if the design is consistent with professional engineering standards. Moreover, the manufacturer's conscious design choice is not grounds for liability if such design complies with governmental safety standards or, in the absence of such standards, the product is accompanied by adequate warnings and instructions. Henderson, *supra* note 1, at 1548-50. See notes 108-29 & accompanying text *infra*.

tive design defect test.¹⁸

A. *The Deviation-from-the-Norm Test*

Under the deviation-from-the-norm test, a product is found defective if it is not of the same quality as other similar products.¹⁹ Although this test has been found reliable in defining manufacturing defects,²⁰ it is

18. An area of disagreement in design defect cases revolves around the issue of whether a test for determining the adequacy of a design should vary depending on whether the cause of action is for negligence or strict liability. See *Renewed Controversy*, *supra* note 3, at 777. Some courts believe that the standard for determining the adequacy of a product's design is the negligence standard of reasonable care. These courts require the application of the negligence standard even though the cause of action asserted by the plaintiff is strict liability in tort or breach of the implied warranty of merchantability under § 2-314 of the Uniform Commercial Code. See, e.g., *Volkswagen of America, Inc. v. Young*, 272 Md. 201, 220-21, 321 A.2d 737, 747-48 (1974); *Balido v. Improved Mach. Inc.*, 29 Cal. App. 3d 633, 640, 105 Cal. Rptr. 890, 895 (1973).

A second approach requires that different design defect standards apply in "strict liability" actions and in negligence actions. See *Newman v. Utility Trailer & Equip. Co.*, 278 Or. 395, 397, 564 P.2d 674, 675-76 (1977). This case distinguishes negligence and strict liability actions: In negligence cases, foreseeability of harm is a question of fact to be determined by the jury, whereas in strict liability cases, the product's harmful propensities are assumed regardless of whether the manufacturer or seller foresaw or should have foreseen the danger. *Id.*; see also *Ulrich v. Kasco Abrasives Co.*, 532 S.W.2d 197, 200 (Ky. 1976); *Newman v. Utility Trailer & Equip. Co.*, 278 Or. 395, 397, 564 P.2d 674, 675-76 (1977); *Phillips v. Kimwood Mach. Co.*, 269 Or. 486, 494-96, 525 P.2d 1033, 1037-38 (1974). Courts following the first approach reject this second approach on the grounds that "a manufacturer who designed the product obviously would have knowledge of the defect, since the design of the product is an intentional act on the manufacturer's part." *Frericks v. General Motors Corp.*, 274 Md. 288, 305, 336 A.2d 118, 128 (1975). At least one jurisdiction has posited another distinction between the design defect standard applicable in negligence actions as opposed to strict liability actions. *Schulides v. Service Mach. Co.*, 448 F. Supp. 1196, 1200 (E.D. Wis. 1978). In a negligence action, there may be recovery for personal injuries caused by a product's design when it was designed without ordinary care even though its design was not established to be unreasonably dangerous, as is required in most jurisdictions in a strict liability action under § 402A of the Restatement of Torts. See, e.g., *Suter v. San Antonio Foundry & Mach. Co.*, 81 N.J. 150, 406 A.2d 140 (1979); *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 573 P.2d 443, 143 Cal. Rptr. 225 (1978). This doctrine has been criticized, however, on the grounds that a "designer cannot have been negligent in his design choices unless the resulting design poses an unreasonable risk of harm." *Renewed Controversy*, *supra* note 3, at 803.

Another issue considered in design defect litigation revolves around the rule that some courts apply to deny recovery to a plaintiff who was injured by design defects whose dangers are patent or obvious. See *Williams v. Brasea, Inc.*, 497 F.2d 67, rehearing denied, 513 F.2d 301 (5th Cir. 1974), cert. denied, 423 U.S. 906 (1975); *Auburn Mach. Works Co. v. Jones*, 366 So. 2d 1167 (Fla. 1979); *Micallef v. Miehle Co.*, 39 N.Y.2d 376, 348 N.E.2d 571, 384 N.Y.S.2d 115 (1976). The majority of courts, however, find that a manufacturer can still be liable for injuries caused by a design defect whose dangers are obvious or patent if there is a feasible, inexpensive, alternate design available that would reduce or eliminate the risk of injury. See, e.g., *Micallef v. Miehle Co.*, 39 N.Y.2d 376, 384-85, 348 N.E.2d 571, 576-77, 384 N.Y.S.2d 115, 120-21 (1976); *Palmer v. Massey-Ferguson, Inc.*, 3 Wash. App. 508, 517, 476 P.2d 713, 718-19 (1970). See generally *Darling, The Patent Danger Rule: An Analysis and a Survey of its Vitality*, 29 MERCER L. REV. 583 (1978); *Marschall, An Obvious Wrong Does Not Make a Right: Manufacturers' Liability for Patently Dangerous Products*, 48 N.Y.U.L. REV. 1065 (1973).

19. For example, a soda bottle is defective if it is chipped around its mouth.

20. See, e.g., *Elmore v. American Motors Corp.*, 70 Cal. 2d 578, 451 P.2d 84, 75 Cal. Rptr. 652 (1969) (automobile found to have defectively connected drive shaft); *Vandermark v. Ford Motor Co.*, 61 Cal. 2d 256, 391 P.2d 168, 37 Cal. Rptr. 896 (1964) (automobile defectively manufactured where brakes activated unexpectedly); *Greenman v. Yuba Power Prod., Inc.*, 59 Cal. 2d 57, 377 P.2d 897, 27 Cal. Rptr. 697 (1962) (lathe built without proper fastening device found defective when similar lathes incorporated device).

unsuitable in design defect cases for several reasons. First, while comparing one manufacturer's line of products with those of other manufacturers may be helpful in determining whether the design is inferior to its counterparts, courts have not viewed consistency with industrywide practices as the determinative factor in strict liability or negligence cases.²¹ The deviation-from-the-norm test thus can never be definitive in ascertaining a design defect.²²

Second, this test may be over-inclusive in defining design defects and may deprive society of many worthwhile and necessary products.²³ The polio vaccine, for example, is an unavoidably dangerous product because it contains an inherent risk that the user will react adversely to the product and contract polio.²⁴ Under the deviation-from-the-norm test, these types of unavoidably dangerous products would be found defective, and consequently manufacturers would no longer market them.²⁵

Finally, this test places the burden of proving the product's deviation on the plaintiff.²⁶ In design defect litigation, this is a particularly heavy burden because the plaintiff must offer technical evidence on how a manufacturer's engineering standards deviate in quality from the design standards of other manufacturers. The deviation-from-the-norm test is therefore unsuitable for application in design defect cases because it defeats one of the major goals of products liability theory—relieving the plaintiff of the burden of proof.²⁷

B. The Restatement (Second) of Torts Section 402A Test

Section 402A of the Restatement (Second) of Torts imposes liability on a seller for any injury caused by a product if the product is, at the time it left the seller's hands, in a defective condition that is unreasonably dangerous to the user, to the consumer, or to his property.²⁸ Courts have interpreted section 402A in several ways. Although most courts

21. *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871, 881 (Alaska 1979).

22. *Id.*

23. See Traynor, *supra* note 12, at 367.

24. In *Davis v. Wyeth Laboratories, Inc.*, 399 F.2d 121 (9th Cir. 1968), the court stated that the manufacturer of Sabin oral polio vaccine could not be held liable solely because plaintiff had contracted polio after receiving the vaccine. The court stated in dicta that a manufacturer cannot guarantee to every user that the drug is safe for his individual use. Such a requirement would deter manufacturers from marketing drugs that are normally the most effective in combatting disease. *Id.* at 128.

25. See generally Keeton, *Products Liability—Drugs and Cosmetics*, 25 VAND. L. REV. 131, 134 (1972).

26. *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871, 882 (Alaska 1979).

27. *Id.* For a more extensive discussion of the inadequacies of the deviation-from-the-norm test, see Traynor, *supra* note 12, at 367-73.

28. RESTATEMENT, *supra* note 13, § 402A. The seller must also be engaged in the business of selling that product and the product must be expected to, and does, reach the consumer without substantial change in its condition. If the plaintiff meets the standards of this test, he has no burden of proving specific acts of negligence by the manufacturer, who is then deemed negligent *per se*. See

apply section 402A in conjunction with the American Law Institute's comments g and i, termed the ordinary consumer expectations test,²⁹ or with a risk-utility balancing test,³⁰ some courts have adopted it as a design defect standard exclusive of the comments.³¹

A design defect standard such as section 402A, exclusive of comments g and i, that simply states that a product's design is defective if the product's condition is unreasonably dangerous to the user or consumer, provides only minimal, if any, guidance to a trial judge. No guidelines exist to help the judge decide whether a design defect case should go to the jury, and, if the case does reach the jury, the jurors are given little or no guidance in formulating a judgment. The jury thus would decide design defect cases on the basis of whim or caprice if this test were all that the judge charged in the jury instructions. This standard also is deficient in providing guidelines for manufacturers regarding safety features that should be incorporated into the product's design.³²

C. *The Ordinary Consumer Expectations Test*

A number of courts that have adopted the section 402A test base the definition of a defective product on comments g³³ and i.³⁴ The use of

Vincer v. Esther Williams All-Aluminum Swimming Pool Co., 69 Wis. 2d 326, 330, 230 N.W.2d 794, 797 (1975).

29. See, e.g., Vincer v. Esther Williams All-Aluminum Swimming Pool Co., 69 Wis. 2d 326, 230 N.W.2d 794 (1975) (plaintiff failed to establish a cause of action for strict liability against seller and manufacturer because product did not contain unreasonably dangerous defective condition as defined in comments g and i). The texts of comments g and i are set forth in notes 33 & 34 *infra*.

30. See, e.g., Cepeda v. Cumberland Eng'g Co., 76 N.J. 152, 386 A.2d 816 (1978) (jury should apply risk/utility analysis in determining liability that questions whether reasonably prudent manufacturer would place product on the market after balancing hazards against utility).

31. See Dippel v. Sciano, 37 Wis. 2d 443, 459, 155 N.W.2d 55, 63 (1967) (sufficiency of complaint against manufacturer judged without reference to supplemental comments though court refused to specifically accept or reject them). Section 402A is followed by 17 comments that are used by many courts when applying the section to a factual situation.

32. The § 402A test without comments g and i also is unsuitable for use by courts that have deleted the "unreasonably dangerous" requirement from design defect cases based on strict liability. A workable definition of "defective condition" is still needed. See Cronin v. J.B.E. Olson Corp., 8 Cal. 3d 121, 501 P.2d 1153, 104 Cal. Rptr. 433 (1972). In *Cronin* the court used comments g and i to define defectiveness, but rejected the term "unreasonably dangerous" as placing a burden that rings of negligence on a plaintiff in a strict liability case. *Id.* at 133, 501 P.2d at 1162, 104 Cal. Rptr. at 442.

33. Comment g defines "defective condition" in part as follows: "The rule stated in this Section applies only where the product is, at the time it leaves the seller's hands, in a condition not contemplated by the ultimate consumer, which will be unreasonably dangerous to him." RESTATEMENT, *supra* note 13, § 402A.

34. Comment i defines "unreasonably dangerous" in part as follows:

Many products cannot possibly be made entirely safe for all consumption, and any food or drug necessarily involves some risk of harm, if only from over-consumption. Ordinary sugar is a deadly poison to diabetics, and castor oil found use under Mussolini as an instrument of torture. That is not what is meant by 'unreasonably dangerous' in this Section. The article sold must be dangerous to an extent beyond that which would be contemplated by the ordinary customer who purchases it, with the ordinary knowledge common to the community as to its characteristics.

section 402A in conjunction with the two comments is generally called the ordinary consumer expectations test, under which there are two common approaches: user-oriented and seller-oriented. Under the user-oriented approach, a product is defective if: (1) it leaves the seller's hands in an unreasonably dangerous condition not contemplated by the consumer, and (2) it is more dangerous than the ordinary consumer with ordinary knowledge of its characteristics would expect.³⁵ This test gives legal effect to consumer expectations that result from the manufacturer or seller placing the product in the stream of commerce with the intention that it be purchased.³⁶ By marketing the product, the seller represents that it is not unreasonably dangerous if put to its intended use.³⁷

Under the seller-oriented approach, a product is defective if it is so unreasonably dangerous that a reasonable seller would not have sold the product had he known of its harmful character.³⁸ The Oregon Supreme Court argues that the user-oriented standards are essentially the same as those of the seller-oriented approach "because a seller acting

RESTATEMENT, *supra* note 13, § 402A.

35. See, e.g., *Greeno v. Clark Equip. Co.*, 237 F. Supp. 427 (N.D. Ind. 1965); *Ginnis v. Mapes Hotel Corp.*, 86 Nev. 408, 470 P.2d 135 (1970); *Heaton v. Ford Motor Co.*, 248 Or. 467, 435 P.2d 806 (1967); *Vincer v. Esther Williams All-Aluminum Swimming Pool Co.*, 69 Wis. 2d 326, 230 N.W.2d 794 (1975). This test is also referred to as the user-oriented or seller-oriented test. Note also that there is some dispute over whether the Restatement's standards of "defective condition" and "unreasonably dangerous" establish one or two requirements. It has been suggested that § 402A enunciates two distinct requirements for recovery and that unless a product is both defective and unreasonably dangerous, liability will not be imposed. *Cronin v. J.B.E. Olson Corp.*, 8 Cal. 3d 121, 133, 501 P.2d 1153, 1162, 104 Cal. Rptr. 433, 442 (1972). *Dean Wade* argues, on the other hand, that the two terms comprise only one test. *Wade, supra* note 1, at 829. See also *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871, 882 n.36 (Alaska 1979).

36. *Markle v. Mulholland's, Inc.*, 265 Or. 259, 263, 509 P.2d 529, 532 (1973).

37. *Id.* The court assumes that a rationale similar to that which underlies an implied warranty of merchantability is part of the theoretical basis for § 402A. The court thus analogizes the term "defective" under strict liability theory to "unmerchantable" under the theory of implied warranty for the sale of goods.

38. *Welch v. Outboard Marine Corp.*, 481 F.2d 252, 254 (5th Cir. 1973) (lack of harmful character of lawnmower design found not to be unreasonably dangerous for normal use); *Phillips v. Kimwood Mach. Co.*, 269 Or. 485, 491, 525 P.2d 1033, 1036 (1974) (reasonably prudent manufacturer having knowledge of the manner in which sanding machine was used would have provided safety feature or additional warning).

At one time, the Texas Supreme Court required the jury to be instructed in a design defect case that a design is defective if it is unreasonably dangerous. Such condition exists "(1) if the product threatens harm to persons using the [product] to the extent that any [product] so designed would not be placed in the channels of commerce by a prudent manufacturer aware of the risk involved in its use or (2) to the extent that the [product] would not meet the reasonable expectations of the ordinary consumer as to its safety." *Turner v. General Motors Corp.*, 584 S.W.2d 844, 850 (Tex. 1979) (citing *Henderson v. Ford Motor Corp.*, 519 S.W.2d 87 (Tex. 1974); *General Motors Corp. v. Hopkins*, 548 S.W.2d 344 (Tex. 1977)). The *Turner* case involved an alleged crashworthiness design defect in which the plaintiff sought to recover damages for paralysis that resulted from his vertebrae being crushed when his automobile rolled over, collapsing the car's roof. The Texas court in *Turner* noted that the first prong of this instruction on unreasonably dangerous design that draws the jury's attention to "the additional perspective of the prudent manufacturer is to the advantage and for the benefit of an injured plaintiff and is available to him if under the facts the defect is apparent, or if it is felt that the fact finders might be diverted by the lack of expectations of the consumer with regard to the details of product design." *Id.* at 850.

reasonably would be selling the same product which a reasonable consumer believes he is purchasing."³⁹

Some courts have added to the confusion surrounding defect tests by describing both the user-oriented and seller-oriented standards as the weighing of the product's utility against the risk of harm of its use, thereby suggesting that the consumer expectations test is synonymous with the risk-utility test.⁴⁰ In actual application, however, user-oriented and seller-oriented tests cannot be viewed as identical to the risk-utility test because juries are not instructed to decide design defect cases based upon a risk-utility analysis. For example, although the Oregon Supreme Court requires the trial court to apply the risk-utility test in determining whether to send a design defect case to the jury, the jury itself is instructed to use the seller-oriented standard in its determination.⁴¹

Under the user-oriented or the seller-oriented standard, a court will not allow a jury to speculate about the expectations of the ordinary consumer.⁴² The jurors must base the determination upon the experiences of an average person, expert testimony, or other evidence that establishes what reasonable consumers expect from a product.⁴³ The problem with this approach, however, is that jury instructions merely state that a product is defectively designed if: (1) the plaintiff demonstrates that it failed to perform as safely as an ordinary consumer would expect when it was used in an intended or reasonably foreseeable manner,⁴⁴ or (2) it is so harmful to persons or property that a reasonably prudent

39. Phillips v. Kimwood Mach. Co., 269 Or. 485, 493, 525 P.2d 1033, 1037 (1974).

40. See, e.g., Cepeda v. Cumberland Eng'r Co., 76 N.J. 152, 172-74, 386 A.2d 816, 826-27 (1978); Turner v. General Motors Corp., 584 S.W.2d 844, 849 (Tex. 1979). See also Wade, *supra* note 1, at 837-40.

41. See, e.g., Roach v. Kononen, 269 Or. 457, 525 P.2d 125, 129 (1974).

42. See Heaton v. Ford Motor Co., 248 Or. 467, 435 P.2d 806 (1967) (evidence not sufficient for jury to make informed decision on what ordinary consumer expects from product).

43. The jury is charged with determining the factual question of what reasonable consumers expect from the product. Where the jury has no experience for knowing this, however, the record must supply such a basis. In the absence of either common experience or evidence, any verdict would, in effect, be the jury's opinion of how safe the product should be. Such an opinion by the jury would be formed without the benefit of data concerning the cost or feasibility of designing and building safer products. Without reference to relevant factual data, the jury has no special qualifications for deciding what is reasonable. *Id.* at 474, 435 P.2d at 809. In Turner v. General Motors Corp., 584 S.W.2d 844 (Tex. 1979), the court held that in instructing the jury on the ordinary consumer expectation test, the jury need not be told that the expectations of the ordinary consumer must be reasonable; jurors know "what ordinary consumers would expect in the consumption or use of a product" and jurors "would [not] or could [not] apply any standard or test outside that of their own experiences and expectations." *Id.* at 851. Earlier in the opinion, however, the court stated, inconsistently and without further explanation, that evidence about ordinary consumer expectations as well as risk and utility can be introduced in design defect litigation. *Id.* at 847. This latter statement was meant to refer possibly to cases involving the risk-utility balancing test, which the court adopted for future design defect cases. See text accompanying notes 79-80 *infra*.

44. Barker v. Lull Eng'r Co., 20 Cal. 3d 413, 432, 573 P.2d 443, 457, 143 Cal. Rptr. 225, 239 (1978). Although the court in Barker created a two-pronged test, the second prong of which is the risk-utility test, the first part of the jury instructions adopted for this test is, in fact, the user-oriented test.

manufacturer or supplier with this knowledge would not have placed it on the market.⁴⁵ Neither instruction gives the jury any criteria by which to decide whether the manufacturer's design is adequate, nor does it give the manufacturer any guidance regarding how safe he must make the product.⁴⁶

Before designing a product, a manufacturer could try to determine an ordinary consumer's expectations of its performance and safety by conducting a public opinion survey. No court using either the user-oriented or the seller-oriented approach, however, has indicated that a product's design would be deemed adequate if its safety and performance features complied with consumer expectations as determined by surveys. Even if survey results were held determinative under the user-oriented standard, courts do not specify clearly what group of consumers should be used in determining ordinary consumer expectations. Courts give no indication whether ordinary consumer expectations are those of ordinary consumers throughout the country, the state, or the neighborhood where the plaintiff purchased the product.⁴⁷

If courts accept surveys as evidence of ordinary consumer expectations in design defect cases under either the user-oriented or the seller-oriented standard, certain problems remain. Public opinion surveys must poll a representative sample of relevant consumers. Furthermore, if jurors are to determine average consumer expectations based upon either their own experiences or the testimony of an expert witness, courts must provide a frame of reference upon which to base such a determination.⁴⁸

Even if courts that apply the user-oriented standard provide manufacturers, expert witnesses, and juries with a frame of reference for consumer expectations, manufacturers probably would face high costs in designing products to meet consumers' expectations in a particular locality. Manufacturers would be forced to determine ordinary consumer expectations in each jurisdiction, either through surveys or expert witnesses, and would have to design and manufacture products to conform

45. *Phillips v. Kimwood Mach. Co.*, 269 Or. 485, 492-93, 525 P.2d 1033, 1036-37 (1974). *See also Welch v. Outboard Motor Corp.*, 481 F.2d 252, 254 (5th Cir. 1973).

46. In jurisdictions that follow the user-oriented test and allow recovery in a design defect case even if the defect is patent, *see* note 18 *supra*, the obviousness of the defect to the ordinary person is a relevant factor in determining ordinary consumer expectations with respect to the product's safety. *See Metal Window Prods. Co. v. Magnussen*, 485 S.W.2d 355 (Tex. Civ. App. 1972) (obvious lack of decal on glass door to warn of its existence not beyond contemplation of ordinary consumer); *Young v. Tide Craft, Inc.*, 270 S.C. 453, 242 S.E.2d 671 (1978) (obvious lack of kill switch on motorboat not beyond contemplation of consumer).

47. The plaintiff's residence, the place of injury, or the location of design or manufacture of the product could also provide the frame of reference for determining ordinary consumer expectations.

48. *See Heaton v. Ford Motor Co.*, 248 Or. 467, 435 P.2d 806 (1967) (where no direct or circumstantial evidence available, testimony of expert witness may be sufficient for jury to find product failed to meet reasonable consumer expectations).

to each jurisdiction's design standard. The more substantial the variation among the various standards, the greater the manufacturer's costs. User-oriented or seller-oriented tests that permit design defect standards to vary among jurisdictions might place such a substantial burden on interstate commerce that such standards might be found unconstitutional under the commerce clause of the United States Constitution.⁴⁹

The user-oriented test also poses problems in defining ordinary consumer expectations where the person injured is a user of the product who was neither the purchaser nor a bystander injured by someone else's use of the product. This problem exists because the courts following the ordinary consumer expectation test do not indicate whether the ordinary consumer in question is the person who purchased the product or selected its user or is the person injured by the product. Questions arise about whether the safety of a product purchased by an adult for use by a child should be measured from the standpoint of the child's expectations or the adult's expectations,⁵⁰ or where a patient is injured by a drug a physician prescribes, whether the test should be defined in terms of the doctor's expectations or the patient's expectations.⁵¹ Similar questions arise in cases involving employees who are injured while using equipment or products selected or purchased by the employer or other employees⁵² or when one party involved in an accident is injured by a product belonging to another.⁵³ Problems also occur when the person injured by a product has lower expectations of product safety or performance because of expertise or cynicism.⁵⁴

The user-oriented standard also is inadequate to resolve several other types of cases. For example, the test is inapplicable in situations in which an ordinary consumer has no definite expectations about the product because he has no idea how safe it can be made.⁵⁵ He thus is

49. U.S. CONST. art. I, § 8, cl. 3; see *Bibb v. Navajo Freight Lines, Inc.*, 359 U.S. 520 (1959). In *Bibb*, the Supreme Court held that even a state in the exercise of its police power may offend the commerce clause if, by a safety regulation, it places too heavy a burden on interstate commerce, uncompensated by compelling advantages. *Id.* at 529.

50. See *Bellote v. Zayre Corp.*, 116 N.H. 52, 352 A.2d 723 (1976) (court determines "unreasonably dangerous" from parent's viewpoint where parent buys pajamas for child, and child sets self on fire while playing with matches).

51. See *V. Mueller & Co. v. Corley*, 570 S.W.2d 140 (Tex. Civ. App. 1978) (standard for "unreasonably dangerous" determined by expectations of ultimate consumer, the patient, even if prosthesis selected and implanted by physician).

52. See *Jackson v. Coast Paint & Lacquer Co.*, 499 F.2d 809 (9th Cir. 1974) (where plaintiff injured by paint that ignited, standard for "unreasonably dangerous" determined by expectations of ultimate user, the painter, not his employer).

53. See *Cornelius v. Bay Motors, Inc.*, 258 Or. 564, 484 P.2d 299 (1971) ("unreasonably dangerous" not determined by expectations of driver in one car who was injured by second car).

54. See Rheingold, *What are the Consumer's "Reasonable Expectations"?*, 29 BUS. LAW. 589, 593 n.16 (1967).

55. *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 430, 573 P.2d 443, 454, 143 Cal. Rptr. 225, 236 (1978) (citing *Wade*, *supra* note 1, at 829).

unable to recover for his injuries because he did not have the requisite expectation. Another type of case in which the test does not provide suitable results occurs in situations in which products with a dangerous or unsafe reputation cause a consumer's injury. In such cases, ordinary consumers, anticipating the possibility of being injured by such a product, would also be denied recovery.⁵⁶

D. The Risk-Utility Test

Under the risk-utility test, either the judge or the jury can determine whether the magnitude of the risk of harm presented by a product's design outweighs its utility in order to hold the manufacturer liable.⁵⁷ Under this test, a manufacturer is liable for injuries caused to a consumer engaged in a reasonably foreseeable use or misuse of the product, if the judge or the jury finds that a reasonably prudent manufacturer would not have marketed such a product after considering its hazards and utility as well as the ease of adopting an alternative safer design.⁵⁸

In applying the risk-utility test, courts weigh a number of factors to determine whether the product's design subjects a user to an unreasonable risk of injury.⁵⁹ Many courts that apply this test consider the following factors in balancing a product's overall risks and utility: (1) its usefulness and desirability to both the user and the general public; (2) the likelihood and potential seriousness of injury; (3) the availability of safer alternatives; (4) the ease and expense with which the manufacturer could modify the design to eliminate its unsafe character without impairing its utility; (5) the user's ability to avoid danger by exercising care in its use; (6) the user's awareness of the inherent dangers, either because of the product's obvious unsafe condition or the existence of suitable

56. *Id.* at 425, 573 P.2d at 451, 143 Cal. Rptr. at 233.

57. See *Renewed Controversy*, *supra* note 3, at 775 n.10. For further discussion of the respective roles of the judge and jury in a risk-utility analysis, see notes 67-82 & accompanying text *infra*.

58. *Cepeda v. Cumberland Eng'r Co.*, 76 N.J. 152, 163, 172-74, 386 A.2d 816, 821, 825-28 (1978). One court has explained its preference for this test on the grounds that a finding of a design defect by balancing the diverse factors relating to its desirability and dangerousness represents a determination that the design is "wrong"; the court, therefore, is justified in imposing legal responsibility for the resulting harm. *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871, 883 (Alaska 1979).

59. See, e.g., *Larsen v. General Motors Corp.*, 391 F.2d 495 (8th Cir. 1968) (automobile manufacturer under a duty to avoid unreasonable risk); *Volkswagen of America, Inc. v. Young*, 272 Md. 201, 321 A.2d 737 (1974) (negligent automobile design subjected user to unreasonable risk during "second collision"); *Cepeda v. Cumberland Eng'r Co.*, 76 N.J. 152, 386 A.2d 816 (1978) (feasibility and expense of installing safety lock weighed against risk of harm renders product unreasonably dangerous); *Micallef v. Miehle Co.*, 39 N.Y.2d 376, 348 N.E.2d 571, 384 N.Y.S.2d 115 (1976) (photo-offset press machine manufacturer liable if plaintiff exposed to unreasonable risk of harm); *Roach v. Kononen*, 269 Or. 457, 525 P.2d 125 (1974) (where only six or seven cases of inadvertent hood openings reported in seven or eight years, jury could find risk of injury not unreasonable); *Turner v. General Motors Corp.*, 514 S.W.2d 497 (Tex. Civ. App. 1974) (failure to construct car roofs with roll bars or roll cages exposed user to unreasonable risk, *rev'd on other grounds*, 584 S.W.2d 844 (Tex. 1979). See also *Garst v. General Motors Corp.*, 207 Kan. 2, 484 P.2d 47 (1971).

warnings or instructions; and (7) the manufacturer's ability to absorb the loss through price adjustments or liability insurance.⁶⁰ In cases involving alleged defects in the crashworthiness of automobiles,⁶¹ for example, courts following the risk-utility test weigh the style, type, and particular purpose of the automobile,⁶² the price of the automobile,⁶³ the cost of changing the design to eliminate the risk,⁶⁴ the nature of the accident that resulted in plaintiff's injury,⁶⁵ and the extent to which an alternative design proposed by the plaintiff would pose a safety hazard greater than that of the existing design.⁶⁶

Courts that follow the risk-utility test in design defect cases disagree on the nature of the respective roles of the judge and the jury in a jury trial.⁶⁷ Some courts require the trial judge to apply the risk-utility test only to determine whether to send a design defect case to a jury. In these jurisdictions, the jury applies a design defect standard that differs from

60. These factors are suggested in Wade, *supra* note 1, at 837-38. See General Elec. Co. v. Bush, 88 Nev. 360, 364, 498 P.2d 366, 369 (1972) (injury arising despite reasonable care in product's use). See also Cepeda v. Cumberland Eng'r Co., 76 N.J. 152, 172-74, 386 A.2d 816, 826-27 (1978). Cf. Fischer, *supra* note 3, at 359 (listing 15 factors courts should consider in imposing strict liability). It should be noted that some jurisdictions that have rejected the patent defect rule, see note 18 *supra*, nevertheless consider the obvious character of the defect as one factor in the overall balancing process. See Dorsey v. Yoder, 331 F. Supp. 753, 760 (E.D. Pa. 1971), *aff'd*, 474 F.2d 1339 (3d Cir. 1973); cf. Myers v. Montgomery Ward & Co., 253 Md. 282, 252 A.2d 855 (1969) (no liability where position of power lawnmower blade was obvious and not latent defect); see note 18 *supra*.

61. See note 1 *supra*.

62. See Dreisonstok v. Volkswagenwerk, A.G., 489 F.2d 1066, 1072 (4th Cir. 1974) (citing Dyson v. General Motors Corp., 298 F. Supp. 1064, 1073 (E.D. Pa. 1969)), in which the court stated that a "convertible could not be made 'as safe in roll-over accidents as a standard four-door sedan with center posts and full-door frames.'" See also Garst v. General Motors Corp., 207 Kan. 2, 484 P.2d 47 (1971) (intended purpose of 40-ton earth-mover should be considered in determining if it was designed negligently).

63. See Dreisonstok v. Volkswagenwerk, A.G., 489 F.2d 1066, 1073 (4th Cir. 1974) (Cadillac may be expected to afford greater protection than economy car).

64. See Volkswagen of America, Inc. v. Young, 272 Md. 201, 218, 321 A.2d 737, 746 (1974) (in determining reasonableness of design, cost of design change must be weighed against resulting amount of added protection).

65. "It could not reasonably be argued that a car manufacturer should be held liable because its vehicle collapsed when involved in a head-on collision with a large truck, at high speed." Dyson v. General Motors Corp., 298 F. Supp. 1064, 1073 (E.D. Pa. 1969), *quoted in* Dreisonstok v. Volkswagenwerk, A.G., 489 F.2d 1066, 1073 (4th Cir. 1974). A related legal principle in products liability law holds a manufacturer liable for injuries caused by any foreseeable use of a product, with foreseeability a question of fact for the jury except where the accident occurs in a manner so "bizarre" that reasonable minds could not differ. Lahocki v. Contee Sand & Gravel Co., 41 Md. App. 579, 587, 398 A.2d 490, 496 (1979), *rev'd on other grounds sub nom.* General Motors Corp. v. Lahocki, 286 Md. 714, 410 A.2d 1039 (1980). A plaintiff, however, does not have to establish that the particular manner in which the harm occurs or the accident happens was reasonably foreseeable. See, e.g., Eshbach v. W.T. Grant's & Co., 481 F.2d 940, 943 (3d Cir. 1973) (liability is not dependent on the ability to foresee the manner in which a lawnmower will be put to its foreseeable use); Newman v. Utility Trailer & Equip. Co., 278 Or. 395, 564 P.2d 674 (1977) (inquiry should focus on foreseeable uses of product, not foreseeability of harm).

66. See Wilson v. Piper Aircraft Corp., 282 Or. 61, 577 P.2d 1322, *rehearing denied*, 282 Or. 411, 579 P.2d 1287 (1978); O'Donnell, *Design Litigation and Strict Liability: The Problem of Jury Instructions Which Do Not Instruct*, 56 J. URB. L. 1051, 1060 (1979).

67. See generally O'Donnell, *supra* note 66.

the one the judge applies in determining whether to send the case to the jury. The Oregon Supreme Court, for example, requires the trial judge to apply the risk-utility test in deciding whether to send a design defect case to the jury; the trial judge then instructs the jury under the user-oriented or the seller-oriented approach of the consumer expectations test.⁶⁸ Similarly, the New Jersey Supreme Court requires the trial judge to apply the risk-utility test initially to determine if the case should go to the jury. The court then requires the judge to charge the jury "in terms of whether the product was reasonably fit . . . for its intended or foreseeable purposes when inserted by the defendant into the stream of commerce and, if not, whether as a result damage or injury was incurred by the contemplated users or others who might reasonably be expected to come in contact with it."⁶⁹ When warranted by the particular factual situation or by the nature of the defect, the court will tailor its instructions to focus the jury's attention on any of the factors generally considered under the risk-utility balancing test for which specific proof exists.⁷⁰

In *Azzarello v. Black Brothers Co.*,⁷¹ the Pennsylvania Supreme Court implicitly adopted the risk-utility test by indicating that the question of whether a product's design is defective and unreasonably dangerous within the meaning of section 402A of the Restatement involved a determination that the unavoidable danger it may pose outweighs its utility.⁷² The court stated that this determination is a question of law, the resolution of which depends upon social policy rather than a factual dispute otherwise reserved for the jury.⁷³ In adopting an approach similar to that of the Oregon Supreme Court, the Pennsylvania court decided that application of the risk-utility test constituted a judicial determination of whether the case should go to the jury; the judge should then instruct the jury that it must determine whether the facts support the averments in the complaint.⁷⁴ The court in *Azzarello* held that a jury instruction suggesting that a product is defective if it is unreasonably dangerous is a reversible error because it fails to provide a juror with adequate guidance.⁷⁵ The court stated that once the matter is before the jury, the judge should instruct the jury that it "may find a defect where the product left the supplier's control lacking any element necessary to make it safe for its intended use or possessing any feature

68. *Roach v. Kononen*, 269 Or. 457, 463-64, 525 P.2d 125, 128-29 (1974). See notes 33-56 & accompanying text *supra*.

69. *Suter v. San Angelo Foundry & Mach. Co.*, 81 N.J. 150, 176, 406 A.2d 140, 153 (1979).

70. *Id.*; *Cepeda v. Cumberland Eng'r Co.*, 76 N.J. 152, 174-75, 386 A.2d 816, 827 (1978).

71. 480 Pa. 547, 391 A.2d 1020 (1978).

72. *Id.* at 558, 391 A.2d at 1026.

73. *Id.* See generally O'Donnell, *supra* note 66, at 1070-74.

74. *Azzarello v. Black Bros. Co.*, 480 Pa. 547, 558, 391 A.2d 1020, 1026 (1978).

75. *Id.*

that renders it unsafe for the intended use.”⁷⁶

Several courts that require the jury to apply the risk-utility test do not provide guidance regarding the standard to be applied by the trial judge in deciding whether to send a design defect case to a jury. The courts also do not require jury instructions to explain the factors that the jury should weigh in applying the risk-utility balancing test. In Alaska, for example, the trial judge is not required to determine that the evidence is sufficient to enable a jury reasonably to find for the plaintiff on the issue of proximate cause before submitting the plaintiff's case to the jury.⁷⁷ The jury is instructed to find the design defective if the plaintiff proves that the design proximately caused his injury *and* if the defendant is unable to prove that the benefits of the challenged design outweighed its risk of harm.⁷⁸

The somewhat different approach by a Texas court similarly fails to require the jury to be directed to consider any specific criteria in weighing the risk of harm against the product's utility and relies instead upon the evidence proffered by the parties to direct the jury's attention to relevant criteria.⁷⁹ The Texas approach requires the jury to be instructed simply that it should find a design to be defective if it is “unreasonably dangerous as designed, taking into consideration the utility of the product and the risk involved in its use.”⁸⁰ Unlike the Alaska approach, however, the Texas approach does have the trial judge apply the risk-utility balancing test to the proffered evidence to determine if the case should initially be allowed to go to the jury; it does not inform the trial judge, however, as to which criteria should be applied in performing this review. Furthermore, the trial judge is given no guidance for determining whether evidence proffered by the parties with respect to the risk-utility test should be admissible as relevant and material.

The Alaska approach affords less guidance to the manufacturer than the Oregon, New Jersey, Pennsylvania, and Texas approaches regarding safety features that a manufacturer ought to incorporate into the product.⁸¹ While the other four states that use the risk-utility test require the

76. *Id.* at 559, 391 A.2d at 1027.

77. *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871 (Alaska 1979). The Alaska court actually adopted a two-pronged standard, one prong of which is the risk-utility test that was first proposed by the California Supreme Court in *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 573 P.2d 443, 143 Cal. Rptr. 225 (1978). *See* notes 102-23 & accompanying text *infra*. Although the Alaska court did not adopt only the risk-utility test, the court's comments relative to the risk-utility prong like the *Barker* standard are applicable to a general discussion of this test.

78. *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871, 885 (Alaska 1979).

79. *Turner v. General Motors Corp.*, 584 S.W.2d 844 (Tex. 1979).

80. *Id.* at 847.

81. Indeed, one commentator has suggested that the likely consequences of an approach of this type will be a marked increase in directed verdicts for the plaintiff. Henderson, *Products Liability: California's New Test for Design Defects*, 1 CORPORATION L. REV. 372, 374 (1978).

judge to make an initial risk-utility determination of whether to submit the case to the jury, Alaska neither requires such a determination nor provides guidance regarding what factors to consider in the jury's subsequent cost-benefit analysis. Although the other four states provide greater guidance by having the trial judge determine whether to submit the case to the jury, Oregon, Pennsylvania, and Texas, like Alaska, do not require the judge to bring the relevant factors to the jury's attention. Indeed, the Pennsylvania approach in *Azzarello* provides the jury with an instruction that suggests that the manufacturer must take every precaution, regardless of cost.⁸² Under the holding in *Azzarello*, manufacturers may well be held liable in all design defect cases submitted to the jury, subject only to appellate review of a trial judge's initial application of the risk-utility test.

The New Jersey Supreme Court's approach, by contrast, provides a manufacturer with a greater degree of guidance in designing a product. Under this approach, *both* the judge and the jury have to agree that the manufacturer misapplied the risk-utility analysis before finding his application of the test invalid.⁸³ Although a manufacturer can never be entirely sure that he has designed the product to incorporate all the safety features required by law, the judge-jury relationship under this approach affords the most guidance.

The appellate courts that have adopted the risk-utility test have not specified whether all relevant factors must be weighed equally. This lack of specificity regarding the weight of the relevant factors complicates a manufacturer's application of the risk-utility test during the design process. Indeed, a judge or a jury, or both, may give different weight to the relevant factors than did the manufacturer. Furthermore, not all of the factors considered relevant under the risk-utility analysis can be reduced to objective monetary terms. Certainly, the cost of developing an alternative design and its ultimate effect on the product's price can be defined precisely in economic terms. Other factors, however, such as the effect of an alternative design upon the product's utility, are more elusive. Economists can define the loss of a human life or a serious injury in economic terms,⁸⁴ yet the precise economic value to be placed upon these casualties certainly will engender substantial disagreement.⁸⁵

82. *Azzarello v. Black Bros. Co.*, 480 Pa. 547, 558-59, 391 A.2d 1020, 1026-27 (1978). See Henderson, *Products Liability: Controversial New Decision on Design Defects*, 2 CORPORATION L. REV. 246, 248 (1979).

83. *Cepeda v. Cumberland Eng'r Co.*, 76 N.J. 152, 173-75, 180-82, 386 A.2d 816, 826-27, 829-31 (1978).

84. See W. KEETON, D. OWEN & J. MONTGOMERY, *PRODUCTS LIABILITY AND SAFETY: CASES AND MATERIALS* 489-91 (1980).

85. *Id.* (provides estimated values of a lost life by the National Highway Traffic Safety Administration and the National Center for Health Statistics).

Judges, juries, or both, are likely to reject a purely economic analysis that seeks to justify a failure to incorporate certain design changes when loss of human life or serious personal injury is involved.⁸⁶ Consequently, the subjective nature of weighing some of the relevant factors under this test makes the manufacturer's task extremely difficult. Despite earnest efforts to weigh all factors, the manufacturer can never do more than second guess how a judge or a jury might apply the test. Although the risk-utility test specifies criteria for the manufacturer to weigh during the design process that will be reviewed by a judge or a jury, the test cannot provide absolute guidance to a manufacturer regarding what safety features are required in the product's design.⁸⁷

E. The California Hybrid Test

The California Supreme Court has adopted a hybrid design defect test under which a design is held defective if it is found inadequate under either the consumer expectations test or the risk-utility test. In *Barker v. Lull Engineering Co.*,⁸⁸ the California court held that in a design defect case for strict liability in tort, a two-pronged test should be applied to determine a manufacturer's liability. First, under the consumer expectations test, a manufacturer may be held strictly liable if the product does not meet the safety expectations of the ordinary consumer who uses the product for its intended purpose or in a reasonably foreseeable manner. Alternatively, notwithstanding the plaintiff's failure to satisfy the requirements of the first test, the manufacturer can be held liable if the plaintiff proves that the product's design proximately caused his injuries, and the manufacturer fails to demonstrate that the challenged design's benefits outweigh its inherent risk of harm.⁸⁹

The court in *Barker* found the first test analogous to the implied warranty of merchantability of the Uniform Commercial Code⁹⁰ and noted that it would consider circumstantial evidence in finding a product de-

86. See *id.* at 490-91.

87. See Henderson, *supra* note 1, at 1565, which suggests that if a manufacturer establishes at trial that he made a good faith effort to apply the risk-utility test in making the design decision, the trial judge will likely refuse to allow the case to go to the jury.

88. 20 Cal. 3d 413, 573 P.2d 443, 143 Cal. Rptr. 225 (1978).

89. *Id.* at 435, 573 P.2d at 457-58, 143 Cal. Rptr. at 239-40.

[A] product is defective in design (1) if the plaintiff demonstrates that the product failed to perform as safely as an ordinary consumer would expect when used in an intended or reasonably foreseeable manner, or (2) if the plaintiff proves that the product's design proximately caused his injury and the defendant fails to prove, in light of the relevant factors . . . that on balance the benefits of the challenged design outweigh the risk of danger inherent in such design.

Id.

90. *Id.* at 429, 573 P.2d at 454, 143 Cal. Rptr. at 236. See U.C.C. § 2-314 ("Unless excluded or modified (Section 2-316), a warranty that the goods shall be merchantable is implied in a contract for their sale if the seller is a merchant with respect to goods of that kind.").

fective under this test, even if the accident precluded identification of the specific design defect.⁹¹ The court stated that the second test, the risk-utility analysis with the burden of proof on the manufacturer, was necessary because consumers frequently know little or nothing about safety standards.⁹² Under this approach, a jury, in evaluating the adequacy of a product's design, would consider such factors as the dangers inherent in the challenged design, the probability of such danger, the financial and mechanical feasibility of alternative designs, and any adverse consequences of an alternative design.⁹³ In a decision subsequent to *Barker*, the California Supreme Court suggested that the nature of the plaintiff's use of the product was also a relevant factor to be considered under the risk-utility analysis of the second *Barker* test.⁹⁴

The plaintiff in a design defect case has an inherent disadvantage in obtaining the relevant information to prove his case because only the manufacturer may know most of the relevant factors to be weighed under the risk-utility analysis.⁹⁵ In order to remedy this dilemma, the court in *Barker* held that where a plaintiff establishes a prima facie case that the product's design proximately caused his injuries, the burden of proof rests on the defendant to show that the design was not defective under a risk-utility analysis.⁹⁶ Thus, to sustain his burden and avoid liability, the defendant must show that the benefits of the challenged design outweigh the risk of harm. Recognizing the fact that design defect cases implicitly involve a determination of the design's reasonableness with respect to its risks and benefits, the court determined that the term "unreasonably dangerous" would not be required in California in

91. *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 430, 573 P.2d 443, 454, 143 Cal. Rptr. 225, 236 (1978). This is a questionable proposition with respect to alleged design defects. If destruction of the product precludes identification of the specific defect that proximately caused plaintiff's injuries, then the plaintiff could not prove conclusively that a defect in the product's design itself proximately caused his injury. Although a plaintiff cannot prove conclusively that the defect was one of design or manufacture, he still can prove by circumstantial evidence that the product was defective when it left the defendant's control. *See, e.g.*, *Moraca v. Ford Motor Co.*, 66 N.J. 454, 332 A.2d 599 (1975) (circumstantial proof of defect sufficient to support inference that defect was proximate cause of plaintiff's injuries); *Scanlon v. General Motors Corp.*, 65 N.J. 582, 326 A.2d 673 (1974) (age, prior usage of product, durability, and effective operation without maintenance are circumstantial factors to be considered in determining whether inference is permissible that defect existed at time product left defendant's control).

92. *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 430, 573 P.2d 443, 454, 143 Cal. Rptr. 225, 236 (1978) (citing *Wade*, *supra* note 1, at 829).

93. *Id.* at 431, 573 P.2d at 455, 143 Cal. Rptr. at 237.

94. *Daly v. General Motors Corp.*, 20 Cal. 3d 725, 731-43, 575 P.2d 1162, 1165-73, 144 Cal. Rptr. 380, 383-91 (1978) (plaintiff's conduct relative to product is examined and his recovery reduced to extent his own lack of reasonable care contributed to his injury).

95. *Id.* at 748, 575 P.2d at 1175, 144 Cal. Rptr. at 395.

96. *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 433, 573 P.2d 443, 456, 143 Cal. Rptr. 225, 238 (1978). The implications of the impact of the court's allocation of the burden of proof are analyzed in *Renewed Controversy*, *supra* note 3, at 782-97.

a strict liability action under section 402A of the Restatement.⁹⁷

Although the court indicated that a plaintiff who fails to show that a product was designed defectively under the ordinary consumer expectations test can still prove design defectiveness under the risk-utility test, it did not address expressly whether liability could be imposed upon a manufacturer who has indeed sustained his burden under the risk-utility test.⁹⁸ The court suggested, however, that a manufacturer who met his burden under the risk-utility test might be held liable under the ordinary consumer expectations test.⁹⁹ The uncertainty regarding the imposition of liability on a party who has satisfied his burden has resulted in at least one court rejecting the *Barker* approach on the grounds that it

97. *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 432-34, 573 P.2d 443, 456-57, 143 Cal. Rptr. 225, 238-39 (1978). The "unreasonably dangerous" element was first eliminated by the California Supreme Court in *Cronin v. J.B.E. Olson Corp.*, 8 Cal. 3d 121, 501 P.2d 1153, 104 Cal. Rptr. 433 (1972) (manufacturing defect case). The justification for such a change was the court's concern that a strict liability in tort standard that follows § 402A literally might force a plaintiff to prove that a product was defective and unreasonably dangerous. The court cited this double burden of proof as unduly burdensome to an injured plaintiff. It interpreted such an increased burden as inconsistent with the development of strict liability in tort, a doctrine that sought to eliminate the problems of proof inherent in pursuing claims of negligence and warranty. By eliminating the "unreasonably dangerous" element, the court in *Cronin* sought to remove any taint of a negligence standard in imposing strict liability on a manufacturer. *Id.* at 133-34, 501 P.2d at 1162-63, 104 Cal. Rptr. at 441-43. The court in *Barker* found this holding in *Cronin* equally applicable to a design defect case. *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 417, 573 P.2d 443, 446, 143 Cal. Rptr. 225, 228 (1978).

Courts in Pennsylvania and New Jersey also have rejected the "unreasonably dangerous" element in strict liability actions. *See, e.g.*, *Suter v. San Angelo Foundry & Mach. Co.*, 81 N.J. 150, 406 A.2d 140 (1979) (design defect cases); *Berkebile v. Brantly Helicopter Corp.*, 462 Pa. 83, 337 A.2d 893 (1975) (design defect and manufacturing defect cases). Other courts, however, have rejected the approach in *Cronin*. *See, e.g.*, *Byrns v. Riddell, Inc.*, 113 Ariz. 264, 550 P.2d 1065 (1976); *Pothoff v. Alms*, 41 Colo. App. 51, 583 P.2d 309 (1978); *Heldt v. Nicholson Mfg. Co.*, 72 Wis. 2d 110, 240 N.W.2d 154 (1976). These courts, relying upon comments g and i to § 402A of the Restatement, argue that defective products may not be unreasonably dangerous and should not result in liability. As stated by the court in *Ross v. Up-right, Inc.*, 402 F.2d 943, 946 (5th Cir. 1968), the requirement "that the defect render the product unreasonably dangerous reflects a realization that many products . . . have both utility and danger." *See also Nobility Homes, Inc. v. Shrivvers*, 557 S.W.2d 77 (Tex. 1977) (no recovery in strict liability action seeking to recover damages solely for economic loss because if defect does not cause damage other than that caused to product itself, product is not unreasonably dangerous).

In a decision following *Barker*, the California court held that the issue of defective design is to be determined by consideration of the product as a whole, and not solely from the standpoint of the product's alleged defectively designed component. *Daly v. General Motors Corp.*, 20 Cal. 3d 725, 746-47, 575 P.2d 1162, 1174-75, 144 Cal. Rptr. 380, 392-93 (1978). A court should consider all safety features of the product in determining whether the manufacturer designed the product defectively. *Id.* at 747, 575 P.2d at 1175, 144 Cal. Rptr. at 393.

98. *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 426-34, 573 P.2d 443, 452-57, 143 Cal. Rptr. 225, 234-39 (1978). The court did not address the issue of whether a manufacturer could be held liable for a design defect when both parties have satisfied their burdens of proof. If both parties satisfied their burdens, the jury might then decide in favor of the more persuasive or more effective litigant. *Cf. Henderson v. Ford Motor Co.*, 519 S.W.2d 87, 101 (Tex. 1974) (Johnson, J., dissenting) (in two-pronged ordinary consumer expectations test and risk-utility balancing by manufacturer, both parties could satisfy burdens of proof, thus forcing jury to choose which side developed stronger case).

99. *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 430 n.10, 573 P.2d 443, 455 n.10, 143 Cal. Rptr. 225, 237 n.10 (1978).

could confuse a jury.¹⁰⁰

While the court in *Barker* also failed to address directly the issue of liability for dangerous products lacking safer alternative designs, the court suggested that liability might be imposed for ultrahazardous products.¹⁰¹ The possibility of imposing liability for products that normally are dangerous suggests that a judge or a jury would be able to impose liability under the first standard, the ordinary consumer expectations test, where the product fails to afford consumers, ultimate users, or bystanders a minimum degree of protection. Accordingly, a court could impose liability on the manufacturer even if he met his burden under the risk-utility weighing test. In such a case, the manufacturer would be liable for an ultrahazardous product even though he demonstrated that no safer alternative design was available or that an alternative design would make the product too expensive for ordinary consumers.¹⁰² Similarly, even if the manufacturer demonstrated that the alternative design would adversely affect the product's ability to function as intended, liability might still be imposed if it were judged to be inherently dangerous.¹⁰³

The Alaska Supreme Court, which adopted the *Barker* test, did not use precisely the same procedure as California in applying the hybrid standard.¹⁰⁴ Under the *Barker* approach, the trial judge first must determine that it would be reasonable for the jury to find for the plaintiff before instructing the jury under the two tests.¹⁰⁵ The Alaska court, by contrast, does not require the trial judge, before sending the case to the jury, to apply the risk-utility test to determine if the jury could reason-

100. *Stenberg v. Beatrice Foods Co.*, 176 Mont. 123, 576 P.2d 725 (1978). The Supreme Court of Montana rejected a confusing jury instruction that defined the "unreasonably dangerous" requirement in the different contexts of the ordinary consumer expectations test and the risk-utility balancing by the manufacturer. The court in *Stenberg* did not object to the "unreasonably" dangerous standard as did the court in *Barker*. Rather, the confusion that the court in *Stenberg* cited emanated from the inherent difficulty in choosing the proper viewpoint, that of the ordinary consumer or the prudent manufacturer. Whether the product is designated as unreasonably dangerous would depend upon the viewpoint adopted. See *Turner v. General Motors Corp.*, 584 S.W.2d 844 (Tex. 1979), in which the court affirmed a jury instruction that framed "unreasonably dangerous" solely in the context of the ordinary consumer expectations test and omitted the prudent manufacturer risk-utility test. In so doing, the court in *Turner* rejected the bifurcated approach exemplified by *Barker*. *Id.* at 851.

101. *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 430, 573 P.2d 443, 455, 143 Cal. Rptr. 225, 237 (1978) (citing *Jiminez v. Sears, Roebuck & Co.*, 4 Cal. 3d 379, 383, 482 P.2d 681, 684, 93 Cal. Rptr. 769, 772 (1971)).

102. See notes 62-64 & accompanying text *supra*. Risk-utility tests in crashworthiness design defect cases weigh style and type of automobile, its particular purpose, the price of the automobile, and the cost of changing the design to eliminate the risk. *Id.*

103. *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 430, 573 P.2d 443, 454, 143 Cal. Rptr. 225, 236 (1978). Other courts have also recognized that a product must meet minimum safety standards. See, e.g., cases cited in note 142 *infra*.

104. *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871 (Alaska 1979).

105. *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 573 P.2d 443, 143 Cal. Rptr. 225 (1978).

ably find for the plaintiff.¹⁰⁶ The failure of a judge to screen the test initially, however, allows the jury to decide cases by whim or caprice. Moreover, in adopting the *Barker* approach, the Alaska Supreme Court fails to give the jury any guidance regarding the application of the ordinary consumer expectations test, and thus it does not promote the development of safety guidelines for manufacturers.¹⁰⁷

F. Professor Henderson's Test

The sixth identified products liability design defect standard is based upon Professor James Henderson's thesis that courts should not find a product's design to be defective if the design is the result of a manufacturer's conscious choice and if certain criteria are met.¹⁰⁸ Manufacturer compliance with applicable safety standards promulgated by the legislature or an administrative agency would preclude liability under Henderson's test. In the absence of applicable governmental standards, any product that is accompanied by an adequate warning of the risks presented by its design or that has an obvious inherent risk would not be adjudged defective.¹⁰⁹

The Michigan Court of Appeals, relying upon Henderson's thesis, has adopted a similar standard.¹¹⁰ In order to establish a *prima facie* case, a

106. *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871 (Alaska 1979). The court stated that it did not "think it necessary to have a two-tier system where the trial judge, before giving the case to the jury, must first find that it would be reasonable for the jury to find for the plaintiff." *Id.* at 884.

107. The New Jersey approach, by contrast, which allows the judge to screen the test initially, furthers the goal of furnishing manufacturers precise guidelines concerning required safety features. *See Cepeda v. Cumberland Eng'g Co.*, 76 N.J. 152, 173-74, 386 A.2d 816, 826-27 (1978). Moreover, the New Jersey Supreme Court rejected *Barker's* ordinary consumer expectations test on the grounds that ordinary consumers have no expertise that would enable them to determine how safely a product could be designed. The *Barker* approach to the ordinary consumer expectations test was also rejected because the court found the implied warranty of merchantability test irrelevant in a strict liability action alleging a design defect.

108. Henderson, *supra* note 1, at 1552-73; *Defect Litigation*, *supra* note 3, at 793-94. Henderson distinguishes designs resulting from conscious design choices from inadvertent design errors. Henderson, *supra* note 1, at 1547. Henderson cites the selection of raw materials of insufficient strength, *id.* at 1548-49, and hidden dangers, *id.* at 1550, as examples of inadvertent design defects.

109. *Id.* at 1559-60. If governmental regulations specify the warnings and instructions that must accompany the product, strict compliance with such regulations in the drafting of accompanying warnings and instructions would probably absolve the manufacturer from liability under Henderson's test. *See, e.g.*, Federal Hazardous Substances Act, 15 U.S.C. §§ 1261-1274 (1976).

110. *Owens v. Allis-Chalmers Corp.*, 83 Mich. App. 74, 268 N.W.2d 291 (1978). In *Owens*, plaintiff's spouse was killed when a forklift truck he was operating overturned. Plaintiff, in a strict liability action against the truck's manufacturer, alleged that the truck was defectively designed because it lacked seat belts and a protective enclosure for the driver. The Michigan Court of Appeals affirmed the trial court's granting of a directed verdict for the defendant on the grounds that no industry or governmental regulation required installation of such devices. *See also Temple v. Wean United, Inc.*, 50 Ohio St. 2d 317, 364 N.E.2d 267 (1977) (manufacturer who fails to give suitable warning of product's dangerous propensity guilty of negligence). The court in *Temple*, adopting Restatement § 402A, cited comment j, which states that "[i]n order to prevent the product from being unreasonably dangerous, the seller may be required to give directions or warnings . . . as to its use."

plaintiff alleging a defective design must show that the particular design did not conform with a predetermined standard set, for example, by the industry or by government regulation. Alternatively, a plaintiff can establish a *prima facie* case by showing that the inherent risks of the design are latent and that the manufacturer has failed to provide an adequate warning to potential users about such risks.¹¹¹

Henderson does not disagree with the almost universally accepted principle that a manufacturer is not immune from liability in a common law suit for injuries proximately caused by a product's defective design,¹¹² regardless of whether it complies with current legislative or administrative safety standards.¹¹³ Henderson, however, argues that courts should defer to governmental standards because judges and juries have neither the expertise nor the competence to evaluate and adequately comprehend the complex tradeoffs made by design engineers during a conscious design process.¹¹⁴ Moreover, he believes adjudication is a totally inappropriate process for determining the adequacy of a product's design because it allows judges and juries to impose liability upon manufacturers on an arbitrary basis.¹¹⁵

Under Henderson's theory, courts would not be required to establish independent design standards in cases of inadvertent design errors. Rather, liability would depend upon whether the plaintiff established that "conformance by the defendant manufacturer to customary engineering practices would have prevented the product failure"¹¹⁶

One problem that a court or a jury faces in applying this test is the determination of whether a danger presented by a product's design results from an inadvertent design error or a conscious design choice. The various articles in which Henderson has presented his approach provide

111. *Owens v. Allis-Chalmers Corp.*, 83 Mich. App. 74, 81, 268 N.W.2d 291, 295 (1978).

112. *See, e.g.*, *Larsen v. General Motors Corp.*, 391 F.2d 495, 506 (8th Cir. 1968) (National Traffic and Motor Vehicle Safety Act of 1966, § 108(c), 15 U.S.C. § 1397(c) (1976), cited as federal standard not precluding common law liability: "Compliance with any Federal motor vehicle safety standard issued under this subchapter does not exempt any person from any liability under common law.").

113. Federal automobile design safety standards, first established by Congress in 1966, were intended to supplement rather than obviate the law of negligence and products liability. *See, e.g.*, *Turner v. General Motors Corp.*, 514 S.W.2d 497, 506 (Tex. Civ. App. 1974), *rev'd on other grounds*, 584 S.W.2d 844 (Tex. 1979).

114. Henderson, *supra* note 1, at 1577.

115. *Id.* at 1558. Henderson cites irresistible social pressure that generally favors injured plaintiffs as an underlying factor in the unsuitability of adjudication for determining design standards. Henderson notes that "[c]ourts would inevitably resort to some form of judicial coin-flipping, i.e., they would begin to determine defendants' liability on some arbitrary basis rather than on the purported basis of the reasonableness of the product designs brought before them." *Id.*

116. *Id.* at 1552. Henderson states that the courts' ability to delegate successfully these standards to the engineering profession is the result of the self-defeating nature of inadvertent errors. The intended design serves as a standard to condemn the actual design.

no test to guide judges or juries in making this determination.¹¹⁷ Further, if the inadvertent design error standard is applied, Henderson would measure the adequacy of the product's design by determining the collective or customary standards of the engineering profession. Henderson, however, does not state what test should be applied if members of the engineering profession disagree about customary practices. Henderson also does not suggest what a court should do if a defendant establishes that his inadvertent design error conforms with universally accepted engineering standards and the standards are found to be inadequate or unsafe. Henderson cites, and appears to accept, the rule followed by most courts that compliance with industry norms is not the standard to determine the adequacy of a product's design.¹¹⁸ He fails to explain, however, why courts should defer to customary engineering practices but not to industry standards. Industry standards often will be based upon, and thus be indistinguishable from, customary engineering practices. Absolute deference to customary engineering practices—assuming that such practices can be defined—would seem just as objectionable as absolute deference to industry standards.

Henderson's test for evaluating designs that are the result of conscious design choices would exempt manufacturers from liability for a defective design if two conditions are met. In the absence of government safety standards, a manufacturer would not be held liable if he enclosed adequate warnings and instructions with the product *and* if the design's risks were reasonably obvious. Henderson would exempt manufacturers from liability in these two situations, regardless of whether an inexpensive alternative that would not adversely affect the design could eliminate or minimize the risks.

Reliance on warnings rather than on minimum safety design standards, however, might not protect all parties who may have some form of contact with the dangerous product. For instance, a written warning would not adequately protect persons who do not encounter the warnings or do not comprehend the product's dangers. These persons include children, unsophisticated or illiterate users of a product, and bystanders.¹¹⁹ As a matter of public policy, courts should require manu-

117. Twerski, Weinstein, Donaher & Piehler, *supra* note 3, at 528-32.

118. Henderson, *supra* note 1, at 1557. One rationale for this rule is that the lack of adequate safety in a product design may be common throughout an entire industry. *Id.* Evidence of industry custom has been admitted and has had an impact upon decisions affecting product safety. *Id.* Courts following this rule may not defer absolutely to product design standards established by the industry or by authoritative voluntary associations. *See, e.g.,* Owens v. Allis-Chalmers Corp., 83 Mich. App. 74, 268 N.W.2d 291 (1978); *see also* notes 110-11 & accompanying text *supra*.

119. *See generally* Field, *The Young Consumer: A Paradigm Analysis of the Roles of Public and Private Law in Preventing and Redressing Injuries*, 29 MERCER L. REV. 523 (1978); Phillips, *Products Liability for Personal Injury to Minors*, 56 VA. L. REV. 1223 (1970).

facturers to incorporate feasible and inexpensive features in their products to protect such persons from injury.¹²⁰ This requirement should be imposed even though warnings or instructions concerning the product's risks adequately protect most consumers. Similarly unprotected are those persons who understand explicit warnings or who appreciate the risks involved but are powerless to respond effectively to such warnings or risks. Despite the lack of protection afforded these two classes of persons in the absence of minimum safety design standards, Henderson does not alter his test for these situations.¹²¹

Henderson asserts that his conscious design choice test will eliminate the need for judicial review of the complex tradeoffs involved in the design process. Judges that follow the test, however, will be required to undertake a similar task if relevant government safety standards, with which the product's design complies, are challenged as being arbitrary and capricious.¹²² Under the Administrative Procedure Act, an administrative agency's regulations can be held invalid if found by a court to be arbitrary, capricious, or an abuse of discretion.¹²³ The administrative action will be held arbitrary and capricious if the agency in promulgating its regulations did not consider all factors relevant to the exercise of its statutory authority or if it made a clear error in judgment.¹²⁴

The Consumer Product Safety Commission, for example, in establishing safety standards to govern a particular product's design, is required to undertake a risk-utility analysis¹²⁵ similar to the risk-utility design

120. See text accompanying notes 141-43 *infra*.

121. Henderson, *supra* note 1, at 1560 n.122.

122. See Henderson, *Manufacturer's Liability for Defective Product Design: A Proposed Statutory Reform*, 56 N.C.L. REV. 625, 639-40 (1978).

123. 5 U.S.C. § 706(2)(A) (1976).

124. *Citizens to Preserve Overton Park v. Volpe*, 401 U.S. 402, 416 (1971) (court must decide whether Secretary exceeded powers delegated by Congress).

125. The Consumer Product Safety Commission is authorized to establish requirements regarding the design of products, 15 U.S.C. § 2056(a)(1)(A) (1976), when "reasonably necessary to prevent or reduce an unreasonable risk of injury associated with such product." *Id.* § 2056(a)(1). The Commission is required to consider, prior to promulgating a design standard:

- A) the degree and nature of the risk of injury the rule is designed to eliminate or reduce;
- B) the approximate number of consumer products, or types or classes thereof, subject to such rule;
- C) the need of the public for the consumer products subject to such rule, and the probable effect of such rule upon the utility, cost, or availability of such products to meet such need; and
- D) any means of achieving the objective of the order while minimizing adverse effects on competition or disruption or dislocation of manufacturing and other commercial practices consistent with the public health and safety.

15 U.S.C. § 2058(c)(1) (1976). The Commission shall not promulgate a consumer product safety rule unless it finds:

- A) that the rule (including its effective date) is reasonably necessary to eliminate or reduce an unreasonable risk of injury associated with such product;
- B) that the promulgation of the rule is in the public interest; and
- C) in the case of a rule declaring the product a banned hazardous product, that no

defect test.¹²⁶ A court reviewing the Commission's risk-utility analysis must defer to its decision if the agency considered all relevant factors. The court cannot substitute its weighing of these factors for the agency's.¹²⁷ Despite this limitation, a judge reviewing a Commission standard in a conscious-design-choice case would be involved in a process similar to a determination of whether to send a design defect case to the jury.¹²⁸ Determining whether an agency acted arbitrarily and capriciously in applying a risk-utility analysis does not differ significantly from applying the risk-utility test to determine if reasonable jurors could disagree about the adequacy of a product's design.

Henderson does not suggest a test that a court should apply in a conscious-design-choice case where the product's design conforms to a government safety standard held invalid on procedural or substantive grounds under the Administrative Procedure Act.¹²⁹ Presumably, the court would apply the test that is followed in circumstances in which there is no applicable government standard, thereby not subjecting a manufacturer to liability if the product contained adequate warnings and instructions. If this presumption is correct, by accompanying the product with appropriate warnings and instructions, a manufacturer whose product's design conforms to applicable government standards can guard against the possibility of liability for injuries if the standard is declared invalid.

Henderson's design defect test gives the manufacturer more guidance regarding the product's requisite features than do the other tests. Yet it leaves some uncertainties for the manufacturer, such as the determination of whether a design complies with applicable government standards and whether, in the absence of government standards, the product's warnings and instructions adequately apprise consumers of the risks presented by the design and the procedures necessary to avoid such risks.

III. A PROPOSED ALTERNATIVE DESIGN DEFECT STANDARD

Although at least six tests have been posited for determining whether a design is defective, with variations in application regarding the judge-jury relationship making the number of tests even greater, each test is in

feasible consumer product safety standard under this chapter would adequately protect the public from the unreasonable risk of injury associated with such products.

Id. § 2058(c)(2). See also National Traffic and Motor Vehicle Safety Act of 1966, *id.* § 1392(f)(3).

126. See notes 57-87 & accompanying text *supra*. See also *Wilson v. Piper Aircraft Corp.*, 282 Or. 61, 82-83, 577 P.2d 1322, 1332-36 (1978) (Linde, J., concurring) (comparing FAA aircraft safety standards with Oregon's product liability standards for design defects).

127. See *Citizens to Preserve Overton Park v. Volpe*, 401 U.S. 402, 416 (1971).

128. See text accompanying notes 67-82 *supra*.

129. See 5 U.S.C. § 706 (1976).

some way inadequate. The present standards do not require the judge or the jury, as a prerequisite to imposing liability upon a manufacturer, to find that an alternative design exists that is technologically feasible and that would have prevented plaintiff's injuries. Furthermore, by not considering such an alternative design, the courts also fail to examine whether a different design would produce a more efficient allocation of the manufacturer's and society's resources, as determined by a marginal cost-benefit analysis.

The test proposed in this article provides a variation of the risk-utility test by initially focusing upon alternative designs that would reduce or eliminate the risk of danger presented by the existing design. The proposed test would weigh the marginal benefits and utilities afforded by each alternative design against its marginal costs and risks.¹³⁰ The cost and feasibility of a safer design is one factor that currently is weighed under the risk-utility test,¹³¹ but it is weighed along with other factors in a subjective balancing approach that does not give the manufacturer exact guidance regarding safety features required in his product.¹³² Under the proposed test, the plaintiff first would have to establish that there was a technically feasible, alternative design available at the time the product was designed. The plaintiff must show that this alternative would have prevented or at least minimized the injuries caused by the product's design, and that the marginal benefits and utilities resulting from adoption of the alternative safety feature outweigh its marginal costs and risks.¹³³ The test would take into account the extent to which the risk of harm presented by the existing design is patent or obvious or is brought to the attention of consumers and bystanders by warnings or instructions. Under the proposed test, however, "when an unreasonable danger could have been eliminated without excessive cost or loss of product efficiency, liability may attach even though the danger was obvious or there was adequate warning."¹³⁴

130. See Henderson, *supra* note 122, at 630-32. Henderson proposes a product design liability statute imposing specific requirements upon plaintiffs that constitute conditions for recovery. Limited defenses are available to defendants if they can meet a set of specifically described circumstances. These conditions imposed upon the parties compel an examination of the benefits and costs of alternative designs.

131. See text accompanying notes 62-66 *supra*.

132. See text accompanying notes 84-87 *supra* (discussing subjective nature of this weighing and the resulting difficulties).

133. See *Garst v. General Motors Corp.*, 207 Kan. 2, 24, 484 P.2d 47, 62 (1971).

134. *Thibault v. Sears, Roebuck & Co.*, 118 N.H. 802, 809, 395 A.2d 843, 847 (1978). See *Renewed Controversy*, *supra* note 3, at 775-76. An alternative approach would impose upon the plaintiff the burden of establishing that an alternative design or additional safety feature was available at the time the product was designed that would have prevented or reduced the plaintiff's injuries. The burden would then shift to the defendant manufacturer to establish that the marginal costs and risks of such an alternative outweighed its marginal benefits and utilities. The justification for this allocation of the burden of proof, which is similar to the approach taken by the California Supreme Court in *Barker v. Lull Eng'r Co.*, 20 Cal. 3d 413, 573 P.2d 443, 143 Cal. Rptr. 225

Although such a marginal cost-benefit analysis would involve a subjective weighing of many factors, it would be preferable to the risk-utility test in terms of providing guidance to manufacturers regarding required safety features. The manufacturers would be directed to search out and consider all alternative product designs in order to increase the product's safety without significantly raising its cost to the consumer or substantially diminishing its utility. Henderson has criticized a similar proposal on the grounds that a plaintiff's case would rest on theoretical testimony about alternative designs that have not been tested through actual experience.¹³⁵ Other commentators, however, have argued that a design defect case based upon such theoretical testimony is no different than other tort cases in which causation issues are determined by expert testimony in response to hypothetical questions.¹³⁶

Some courts, whether applying the consumer expectations test¹³⁷ or the risk-utility test,¹³⁸ have held that a plaintiff, in order to establish a cause of action in a design defect case, must show that there was a safer, yet practical, alternative design.¹³⁹ Moreover, plaintiffs have been asked to show feasibility in terms of economy, practicality, and technology.¹⁴⁰ The proposed test would also require this showing.

Courts, however, have recognized a caveat to this required proof. If the danger is sufficiently severe and the product has only limited utility, a judge or a jury could find that a reasonable manufacturer would not have introduced such a product into the stream of commerce.¹⁴¹ Many courts recognize that some products simply are too dangerous to be considered adequately designed.¹⁴² The proposed standard reflects this

(1978), is that "most of the evidentiary matters which may be relevant to the determination of the adequacy of a product's design under the 'risk-benefit' standard . . . involve technical matters peculiarly within the knowledge of the manufacturer" *Id.* at 431, 573 P.2d at 455, 143 Cal. Rptr. at 237.

135. See Henderson, *supra* note 1, at 1569-71. See also O'Donnell, *Design Litigation and the State of the Art: Terminology, Practice and Reform*, 11 AKRON L. REV. 627, 646-61 (1978); Comment, *The State of the Art Defense in Products Liability: "Unreasonably Dangerous" to the Injured Consumer*, 18 DUQ. L. REV. 915 (1980).

136. Twerski, Weinstein, Donaher & Piehler, *supra* note 3, at 532-34.

137. See, e.g., *Wilson v. Piper Aircraft Corp.*, 282 Or. 61, 66, 577 P.2d 1322, 1325 (1978).

138. See, e.g., *Huddell v. Levin*, 537 F.2d 736 (3d Cir. 1976) (applying New Jersey law); *Loli v. Ohio Brass Co.*, 502 F.2d 741 (7th Cir. 1974) (applying Illinois law).

139. See notes 137-38 *supra*.

140. See, e.g., *Wilson v. Piper Aircraft Corp.*, 282 Or. 61, 70, 577 P.2d 1322, 1327 (1978) (plaintiff must show effect of alternative design on "cost, economy of operation, maintenance requirements, overall performance, [and] safety"). See also *Loli v. Ohio Brass Co.*, 502 F.2d 741, 744 (7th Cir. 1974).

141. *Wilson v. Piper Aircraft Corp.*, 282 Or. 61, 71 n.5, 577 P.2d 1322, 1328 n.5 (1978).

142. See, e.g., *Drayton v. Jiffie Chem. Corp.*, 395 F. Supp. 1081 (N.D. Ohio 1975) (strict liability imposed for facial burns from liquid drain cleaner with unnecessarily high concentration of an unreasonably caustic chemical); *Sturm, Ruger & Co. v. Day*, 594 P.2d 38 (Alaska 1979) (most stringent warning would not have prevented gun from firing when buyer grabbed it as it slipped during unloading); *Ruggeri v. Minnesota Mining & Mfg. Co.*, 63 Ill. App. 3d 525, 380 N.E.2d 445 (1978) (despite adequate warnings, adhesive too volatile and flammable for intended use); *Sturm,*

same caveat in the plaintiff's burden of proof. Even if a plaintiff could not convince the judge or the jury that an alternative design would have been better than the existing design, a judge or a jury should be permitted to hold that the product presents such a substantial danger to the public that it should not be distributed and sold, even though it incorporates all feasible safety features and includes adequate warnings and instructions.

As a matter of public policy, courts should hold a manufacturer liable for injuries caused by a product he designed and marketed where the product, although accompanied by adequate warnings and instructions, presents a significant risk of danger to consumers and bystanders when used in a reasonably foreseeable manner. This policy should prevail regardless of the cost of adopting safer alternative designs. Such judicial policy would be consistent with the administrative regulatory authority of the Consumer Product Safety Commission to ban the manufacture, sale, and distribution of products that present an unacceptable risk to public health and safety.¹⁴³ The proposed test, however, would recognize, as have the courts that follow comment k of Restatement section 402A,¹⁴⁴ that a manufacturer should not be liable for injuries caused by the design of an "unavoidably unsafe" product where the product's utility outweighs its risk of harm, and the product contains adequate warnings and instructions.

Applying the risk-utility test, some courts have held that the magnitude of the risk of harm should be determined either at the time of trial¹⁴⁵ or at the time of sale.¹⁴⁶ Under the proposed test, the judge or the jury should determine whether a better design was feasible at the time the manufacturer designed the product.¹⁴⁷ Moreover, if a feasible,

Ruger & Co. v. Boyd, PROD. LIAB. REP. (CCH) ¶ 8209 (Ky. Ct. App. 1978) (no warning sufficient where light blow to hammer caused gun to fire); Uloth v. City Tank Corp., 384 N.E.2d 1188 (Mass. 1978) (no warning sufficient where slight change in design of blade on garbage truck would have prevented serious if not fatal injury). *See also* Twerski, Weinstein, Donaher & Pichler, *supra* note 3, at 526.

143. 15 U.S.C. § 2057 (1976).

144. *See, e.g.*, Helene Curtis Indus. v. Pruitt, 385 F.2d 841 (5th Cir. 1967) (professional hair bleaching product not defective where appropriate instructions given), *cert. denied*, 391 U.S. 913 (1968); Cochran v. Brooke, 243 Or. 89, 409 P.2d 904 (1966) (drug prescribed to patient for arthritis not defective); McLeod v. W.S. Merrell Co., 174 So. 2d 736 (Fla. 1965) (druggists not liable where prescription filled in accordance with directions); W. KIMBLE & R.O. LESHER, PRODUCTS LIABILITY §§ 56, 84-85 (West's Series 1979). Prescription drugs are an example of worthwhile "unavoidably unsafe" products.

145. *See, e.g.*, Ross v. Up-Right, Inc., 402 F.2d 943 (5th Cir. 1968) (evaluates present risk of harm of six-year-old ladder).

146. *See, e.g.*, Cepeda v. Cumberland Eng'r Co., 76 N.J. 152, 181, 386 A.2d 816, 830 (1978) (balances gravity of risk to workman operating machine with feasibility and expense of installing safety device in 1956 when machine sold).

147. *See* Bruce v. Martin-Marietta Corp., 544 F.2d 442 (10th Cir. 1976); Mondshour v. General Motors Corp., 298 F. Supp. 111 (D. Md. 1979). *See generally* O'Donnell, *supra* note 135; Phillips, *supra* note 3, at 115-19; Comment, *supra* note 135, at 915.

safer alternative design becomes available between the time of design and the time of manufacture or sale, the manufacturer should have a duty to adopt such a design. This duty would arise unless the cost of retooling machinery, casting new dies and molds, and revising already manufactured components and products is greater than the existing design's risk of harm to consumers and bystanders. If such a feasible alternative design becomes available after the product has been manufactured, distributed, or sold to consumers, the manufacturer should not have a duty to recall the product in order to replace or modify it if the costs of a recall outweigh the existing design's risk to consumers and bystanders.¹⁴⁸

IV. CONCLUSION

The standards that courts presently apply to determine whether a product's design is defective do not provide the manufacturer with sufficient guidance regarding safety requirements that must be incorporated into a product. In actual practice, design defect cases involve a marginal risk-utility analysis comparing a product's design with alternatives that might have reduced or prevented plaintiff's injuries.¹⁴⁹ Adoption of a design defect standard that focuses upon alternatives to the product's design, coupled with a requirement that products meet minimum safety standards, would reflect the actual way in which most courts decide design defect cases. Concomitantly, consumers would be protected from dangerously designed products, and manufacturers would have more specific guidance regarding the safety features to be included in their products that are required by law.

148. The costs of recall, modification, and replacement that a manufacturer would have to bear in complying with this duty would include the transaction costs of locating products that have left his control and possession. Such costs may be high, and the feasibility of locating products low, if retailers have sold the products to members of the public. This would be true particularly in the case of low-priced products for which the retailer does not keep records of individual transactions or for which the manufacturer does not use owner or warranty registration cards. Even if products that have been sold to consumers can be located, the manufacturer will incur administrative expenses in contacting the product's present owners and arranging for its return to him or a service outlet for modification or replacement.

149. See, e.g., Henderson, *supra* note 1, at 1567-68; *Renewed Controversy*, *supra* note 3, at 774-76.